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09/868,505	06/18/2001	Yoshiya Sakaguchi	43890-522	1376

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EXAMINER	
GOFF II, JOHN L	

ART UNIT	PAPER NUMBER
1733	11

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/868,505	SAKAGUCHI ET AL.	
	Examiner	Art Unit	
	John L. Goff	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,16-20 and 23-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,16-20 and 23-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. This action is in response to Amendment C received on 7/16/03. The previous objections to the claims have been overcome. The previous rejections under 35 U.S.C. 112 have been overcome.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claim 31 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Amended claim 31 requires "wherein said first laminate has a substantially planar upper surface which does not contain recesses". It is unclear where in the specification the upper surface of the first laminate is described as planar and without recesses. Applicant has pointed to Figure 1 to support this limitation. However, it is noted the Figures only show a side representation of a stack of green sheets. The Figures do not show the upper surface of the first laminate, and thus, the Figures do not provide support for the claimed limitations.

4. Claim 31 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "substantially" in claim 31 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Amended claim 31 requires "wherein said first laminate has a substantially planar upper surface which does not contain recesses". It is unclear what is required by a "substantially" planar surface, i.e. to what degree could the upper surface deviate from a planar surface. This issue should be clarified and reworded as appropriate.

Claim Rejections - 35 USC § 103

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-11, 13, 16-19, and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hass et al. (U.S. Patent 5,573,622) in view of Pieterse et al. (U.S. Patent 5,268,415) and Kodera (GB 2274810) and optionally in view of Gauci et al. (U.S. Patent 5,478,420).

Hass et al. are directed to a method and apparatus for laminating multilayer structures used in the electronics industry (Column 1, lines 12-14 and Column 2, lines 26-29). Hass et al.

teach a multilayer stack of self-supporting green sheets having asperities on a surface thereof wherein the sheets are formed from a ceramic material and a binder in a conventional process (Column 4, lines 57-65). It is noted that the multilayer stack of green sheets may form a cavity or the stack of green sheets may be the same size, and the individual green sheets and in particular the upper green sheet has a substantially planar surface that does not contain recesses (Figure 1 and Column 4, lines 53-56). Hass et al. teach a method for laminating the multilayer structure comprising placing the multilayer stack of self-supporting green sheets on a rigid plate, placing a deformable, resilient body on the stack, and applying heat, e.g. up to 150 °C, and pressure via a press to the resilient body and the stack causing the binders within the stack to become tacky, i.e. soft, and the layers of the multilayer structure to bond together (Figures 2 and 3 and Column 1, lines 43-46 and Column 3, lines 12-25 and Column 4, lines 40-47 and 57-65 and Column 5, lines 46-55 and Column 6, lines 36-39 and 49-53 and Column 8, lines 37-41 and 59-61). Hass et al. further teach placing a barrier/release sheet between the multilayer stack and the resilient body and preheating the resilient body, stack, and press prior to lamination (Column 6, lines 24-26 and 32-37 and Column 7, lines 15-21). In an alternate embodiment, Hass et al. teach using a resilient body with a greater width than the multilayer stack, and Hass et al. teach placing the multilayer stack between two resilient bodies rather than one resilient body and a rigid plate (Figure 4 and Column 7, lines 56-58 and 63-67 and Column 8, lines 1 and 4-9). It is noted the press provides a framework for covering the multilayer stack (Figures 2 and 3), and the resilient body provides a framework for covering the multilayer stack in the alternate embodiment (Figure 4).

Regarding claim 1, Hass et al. teach laminating the multilayer stack using the binder contained in the sheets of the stack. Hass et al. teach the binder becomes tacky, i.e. soft, during pressing such that Hass et al. meet the limitation of "heating said first laminate at a temperature higher than the temperature at which the polyolefin (binder) is softened". Gauci et al. are further cited as an optional showing of how the laminating taught by Hass et al. occurs, i.e. bonding by softening/melting of the binder in the green sheets. Gauci et al. disclose a process for laminating a multilayer stack of green sheets using a plug (analogous to the elastic body taught by Hass et al.) and press. Gauci et al. teach laminating the multilayer stack in the plug and press by compressing the multilayer stack under temperature, e.g. 60-90 °C, and pressure suitable to cause the ceramic layers to flow together and laminate to each other, i.e. the green sheets are laminated to each other by softening/melting the binder (the flowable component) in the sheets (Column 1, lines 49-51 and Column 2, lines 18-21 and Column 5, lines 23-38). One of ordinary skill in the art at the time the invention was made would have readily appreciated that the laminating taught by Hass et al. occurs in the same manner as that suggested by Gauci et al., i.e. laminating by softening/melting the binder in the green sheets, as Gauci et al. disclose a process for laminating a multilayer of green sheets substantially the same as that taught by Hass et al.

Regarding claims 1, 18, 19, 25, 27, and 29, Hass et al. are silent as to the specific materials used to make the green sheets. However, it is noted Hass et al. teach the green sheets are formed from a ceramic material and a binder in a conventional process, and Hass et al. are not limited to any particular ceramic or binder materials. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the green sheets taught by Hass et al. well known and conventional green sheets such as those shown for example by

Pieterse et al., i.e. green sheets that comprise polyolefin and inorganic powder and have a porosity of less than 80%, as only the expected results would be achieved.

Regarding claims 1, 16, 25, and 27, Hass et al. are silent as to a specific teaching for depressurizing (i.e. applying a vacuum to) the multilayer structure prior to lamination. However, Hass et al. teach evacuating the air in the multilayer to avoid entrapping air during lamination. Hass et al. further teach the evacuating may be performed by any means known to one in the art. One of ordinary skill in the art at the time the invention was made would have readily appreciated evacuating the air in the multilayer as taught by Hass et al. using a vacuum (depressurized atmosphere) technique as it was well known in the art to evacuate a multilayer using vacuum before, during, and after lamination to remove air from the multilayer as shown for example by Kodera.

Regarding claims 7 and 8, Hass et al. are silent as to the surface area of the barrier/release sheet being larger than the contact area between the sheet and the multilayer stack. However, one of ordinary skill in the art at the time the invention was made performing the alternate embodiment (Figure 4) taught by Hass et al. would have readily appreciated using a barrier/release sheet with a surface area larger than the contact area between the sheet and the multilayer stack to ensure the resilient bodies do not adhere to one another.

Regarding claim 25, Hass et al. teach an embodiment using a resilient body with a greater width than the multilayer stack, i.e. the elastic body covers an upper surface and all side surfaces of the stack (Figure 4 and Column 7, lines 56-58 and 63-67 and Column 8, lines 1 and 4-9).

Regarding claim 27, Hass et al. teach an embodiment placing the multilayer stack between two resilient bodies, i.e. the elastic bodies cover an upper surface, a lower surface, and

all side surfaces of the stack (Figure 4 and Column 7, lines 56-58 and 63-67 and Column 8, lines 1 and 4-9).

Regarding claim 30, Hass et al. teach any desired number of sheets may be laminated such that it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the number of green sheets to use in the multilayer depending upon the product made as doing so would require nothing more than ordinary skill and routine experimentation.

Pieterse et al. disclose self-supporting green sheets and a process for making the sheets. Pieterse et al. teach the green sheets comprise inorganic powder and an organic binder, e.g. polyethylene is preferred, and the sheets have porosity of less than 80% (Column 2, lines 48-59 and Column 5, lines 58-60 and Column 11, lines 30-31).

Kodera is directed to a method (and apparatus) for hot-pressing ceramic (green) sheets into a laminate. Kodera teaches the method comprises placing a stack of sheets into a press having upper and lower press platens wherein the upper and/or lower platens have vacuum (air) outlets and elastic sealing sleeves (elastic frame), closing the press to form a hermetically enclosed space containing the stack of sheets, evacuating air from the space by applying vacuum, hot-pressing the sheets under vacuum to form a laminate, and opening and removing the laminate from the hot-press (Figures 1, 4, and 9 and Page 8, lines 21-22 and Page 9, lines 12-13 and Page 10, lines 7-15 and 19-21 and Page 15, lines 17-23 and 26-27 and Page 16, lines 1-2).

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hass et al., Pieterse et al., Kodera, and optionally Gauci et al. as applied above in paragraph 7, and further in view of Natarajan et al. (U.S. Patent 5,759,320).

Hass et al., Pieterse et al., Kodera, and optionally Gauci et al. as applied above teach all of the limitations in claim 12 except for a teaching on using a framework that is equal to or less than the thickness of the multilayer structure. It is noted Hass et al. teach an alternate second embodiment wherein the multilayer does not have a framework (Figure 5 and Column 8, lines 20-22). However, it is known in the art to provide the multilayer with a framework prior to bonding to prevent the green sheets of the multilayer from sliding during lamination as shown by Natarajan et al. One of ordinary skill in the art at the time the invention was made would have readily appreciated incorporating into the alternate second embodiment (Figure 5) taught by Hass et al. as modified by Pieterse et al., Kodera, and optionally Gauci et al. a frame as suggested by Natarajan et al. to prevent the green sheets of the multilayer from sliding during lamination.

Natarajan et al. are directed to a method and apparatus for laminating a multilayer stack of green sheets that contain cavities (asperities) (Column 1, lines 16-21). Natarajan et al. teach a method for laminating the multilayer stack comprising placing a multilayer stack of green sheets on a rigid plate, placing an elastic body on the stack, and applying heat and pressure via a press to the elastic body and the stack to bond the layers of the multilayer structure together (Figures 4-7 and Column 4, lines 65-67 and Column 5, lines 1-5, 9-14, and 66-67 and Column 6, lines 1-5, 7-10, 14-18 and 28-31 and Column 8, lines 8-10). Natarajan et al. further teach placing a frame around the multilayer to prevent the green sheets of the multilayer from sliding during lamination and placing the stack, elastic body, and press within an environmental enclosure prior to lamination (Column 6, lines 10-14 and Column 8, lines 50-55).

9. Claims 20, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hass et al. (U.S. Patent 5,573,622) in view of Kodera (GB 2274810).

Hass et al. are directed to a method and apparatus for laminating multilayer structures used in the electronics industry (Column 1, lines 12-14 and Column 2, lines 26-29). Hass et.al. teach a multilayer stack of self-supporting green sheets having asperities on a surface thereof wherein the sheets are formed from a ceramic material and a binder in a conventional process (Column 4, lines 57-65). It is noted that the multilayer stack of green sheets may form a cavity or the stack of green sheets may be the same size, and the individual green sheets and in particular the upper green sheet has a substantially planar surface that does not contain recesses (Figure 1 and Column 4, lines 53-56). Hass et al. teach a method for laminating the multilayer structure comprising placing the multilayer stack of self-supporting green sheets on a rigid plate, placing a deformable, resilient body on the stack, and applying heat, e.g. up to 150 °C, and pressure via a press to the resilient body and the stack causing the binders within the stack to become tacky, i.e. soft, and the layers of the multilayer structure to bond together (Figures 2 and 3 and Column 1, lines 43-46 and Column 3, lines 12-25 and Column 4, lines 40-47 and 57-65 and Column 5, lines 46-55 and Column 6, lines 36-39 and 49-53 and Column 8, lines 37-41 and 59-61). Hass et al. further teach placing a barrier/release sheet between the multilayer stack and the resilient body and preheating the resilient body, stack, and press prior to lamination (Column 6, lines 24-26 and 32-37 and Column 7, lines 15-21). In an alternate embodiment, Hass et al. teach using a resilient body with a greater width than the multilayer stack, and Hass et al. teach placing the multilayer stack between two resilient bodies rather than one resilient body and a rigid plate (Figure 4 and Column 7, lines 56-58 and 63-67 and Column 8, lines 1 and 4-9). It is noted the press provides a framework for covering the multilayer stack (Figures 2 and 3), and the resilient body provides a framework for covering the multilayer stack in the alternate

embodiment (Figure 4). Hass et al. are silent as to a specific teaching for depressurizing (i.e. applying a vacuum to) the multilayer structure prior to lamination. However, Hass et al. teach evacuating the air in the multilayer to avoid entrapping air during lamination. Hass et al. further teach the evacuating may be performed by any means known to one in the art. One of ordinary skill in the art at the time the invention was made would have readily appreciated evacuating the air in the multilayer as taught by Hass et al. using a vacuum (depressurized atmosphere) technique as it was well known in the art to evacuate a multilayer using vacuum before, during, and after lamination to remove air from the multilayer as shown for example by Kodera.

It is noted Hass et al. teach a first pressing force application member with an elastic body provided inside of a rigid body, and a second pressing force application member with an elastic body provided on a flat rigid body (Figure 4). Hass et al. are silent as to the second pressing force application member comprising an elastic body provided inside of a rigid body. However, the rigid body of the first member extends to enclose the second member, and one of ordinary skill in the art at the time the invention was made would have readily appreciated shortening the rigid body of the first member while providing an extension to the second member to form a second rigid body similar to the first rigid body as only the expected results would be achieved. It is noted the rigid body of the first application member provides a frame for the multilayer structure, and while not specifically recited one would have readily appreciated using a support means to secure the resilient body of the upper member. As to the applied pressing force limitation, it is noted this a method limitation, and the apparatus taught by Hass et al. is capable of performing this limitation.

Kodera is directed to a method (and apparatus) for hot-pressing ceramic (green) sheets into a laminate. Kodera teaches the method comprises placing a stack of sheets into a press having upper and lower press platens wherein the upper and/or lower platens have vacuum (air) outlets and elastic sealing sleeves (elastic frame), closing the press to form a hermetically enclosed space containing the stack of sheets, evacuating air from the space by applying vacuum, hot-pressing the sheets under vacuum to form a laminate, and opening and removing the laminate from the hot-press (Figures 1, 4, and 9 and Page 8, lines 21-22 and Page 9, lines 12-13 and Page 10, lines 7-15 and 19-21 and Page 15, lines 17-23 and 26-27 and Page 16, lines 1-2).

Response to Arguments

10. Applicant's arguments with respect to claims 1-13, 16-20, and 23-28 have been considered but are moot in view of the new ground(s) of rejection. Applicant argues it is only applicants disclosure that discloses a method which comprises applying a pressing force to the first laminate containing polyolefin while heating the first laminate to a temperature higher than the softening temperature of the polyolefin. It is noted Hass et al. teach a process for bonding a multilayer by compressing the multilayer under heat and pressure such that the binders contained in the sheets of the multilayer become tacky and the sheets laminate to one another. Thus, Hass et al. teach that the binder in the green sheets must at least soften. This is further evidenced in the optional reference of Gauci et al. where in a process substantially the same as that taught by Hass et al., i.e. bonding a multilayer by compressing under heat and pressure, Gauci et al. teach the ceramic material, i.e. the binder, flows during compression such that the sheets laminate to one another. Regarding the arguments to claims 25 and 27 see paragraph 7 above.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **703-305-7481**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on 703-308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

John L. Goff
September 25, 2003

Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700